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basic imagery interpretation report

## Hohhot Solid Propellant Complex (S)

STRATEGIC WEAPONS INDUSTRIAL FACILITIES

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CHINA

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RCA-09/0024/80

OCTOBER 1980

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INSTALLATION OR ACTIVITY NAME					COUNTRY
Hohhot Solid Propellant Complex					CH
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NO.	COMIREX NO.	NIETB NO.
NA	40-44-14N 111-57-40E				
MAP REFERENCE					
SAC. USATC, Series 200, Sheet 0288-24, scale 1:200,000					
LATEST IMAGERY USED			NEGATION DATE (if required)		
			NA		

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### ABSTRACT

1. (S/D) This report describes changes and activity at Hohhot Solid Propellant Complex, China, since June 1975, the information cutoff date for the previous report. Major construction during this period indicates that China probably plans to develop and to produce solid-propellant rocket motors up to ICBM booster size. There were also indications that the Chinese submarine-launched ballistic missile (SLBM) program is continuing and that small rocket motors for uses other than SLBMs may also be under development.

2. (S/D) This report includes 16 annotated photographs, a table, two line drawings, and a location map.

### INTRODUCTION

3. (S/D) Hohhot Solid Propellant Complex presently consists of five areas—a rocket motor production plant, a rocket motor test facility, an inert components fabrication plant, a probable final assembly and inspection area, and a support area (Figures 1 and 2). Security walls were constructed around the rocket motor production plant and the rocket motor test facility, indicating increased attention to the security of the complex since the previous report.<sup>1</sup>

4. (S/D) Analysis of activity—the construction of new cast/cure, batch-mix, and fabrication buildings, and the presence of large vacuum bells, probably intended for solid-propellant rocket motor casting—observed at the complex since mid-1978 indicates that a new program to develop large rocket motors up to ICBM booster size is planned at the complex.<sup>2,3</sup> The size of the vacuum bells (or casting bells) indicates that rocket motors as large as the first stage of the US Minuteman or the Soviet SS-16/-20 could be produced at the Hohhot complex.<sup>4,5</sup> A detailed analysis of the casting bells at Hohhot was provided in NPIC report [redacted]

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5. (S/D) There were also indications of continued development of China's SLBM. Evidence of this program has been seen at the Hohhot complex since the late 1960s.<sup>6</sup> Indications of continued development since 1975 included identification of SLBM-sized rocket motors in the test facility, indirect indications of test activity, and activity in the inert components fabrication plant.

### BASIC DESCRIPTION

#### Rocket Motor Production Plant

6. (S/D) A new cast/cure building (item 1, Figure 3) was begun in May 1978. The building contains four concrete casting/curing pits; each pit is [redacted] square on the outside with [redacted] walls. The pits were constructed above ground in a scaffolding and then were lowered so that their tops were at ground level (Figures 4 and 5). This procedure was also used on the two older cast/cure buildings nearby. The new cast/cure building is connected by a breezeway with the adjacent older cast/cure building (Figure 6).

7. (S/D) In December 1979, four large casting bells were identified next to the new cast/cure building (Figure 7). These casting bells will be installed in the casting pits where they will probably be used to cast composite propellant rocket motors in a vacuum. The four casting bells were shipped to the complex in

June 1979, when they were seen for the first time on the rail loading/unloading dock in the inert components fabrication plant (Figure 8). The size of the casting bells would permit rocket motors of up to about [redacted] to be produced (Figure 8). (Note: This estimate is slightly smaller than previously reported.)<sup>3</sup> The casting bells could also be used, as in US missile plants, to cast one large motor or to cast several small motors simultaneously.

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8. (S/D) Two new batch-mix buildings with an associated control building were begun in June 1978 (items 4 through 6, Figures 3, 9, and 10). The buildings were in the midstage of construction by early 1979, but construction was not completed until June 1980. It is possible that the plant was awaiting the delivery of the two mixers; because of their large size, the mixers must be installed before the building is complete. The mix buildings were externally complete by June 1980. The distance

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between the new mix buildings is [redacted] This distance would permit from 400 to 450 gallons of composite propellant to be handled safely in the building at one time; any greater amount would pose the risk of destroying neighboring buildings in the event of an explosion.<sup>7</sup> This amount of propellant is equivalent to the amount used in the largest mixers at US missile plants.

9. (S/D) The western mix building of the older mix line was razed in mid-1975. Reconstruction was begun in late 1977, and the building was externally complete by early 1978 (item 3, Figure 3; item 4, Figures 11 and 12). The design of the building is different from both the reconstructed eastern mix building (item 1, Figure 11) and the two center mix buildings (items 2 and 3).

10. (S/D) Several of the older mix buildings probably underwent internal modification in mid-1979. In July 1979, the roof vent on the west-center building (item 3, Figure 11) was removed, and debris was strewn outside that building and the west mix building (item 4). By August, the vents on both the center mix buildings (items 2 and 3) had been removed. By September, the vents were replaced and the area was cleaned up. In September, numerous objects were seen on the concrete apron outside the mix building (item 5) east of the four similar mix buildings. The objects were probably the discarded machinery from the building, which would indicate that the building was being modified internally.

11. (S/D) A casting bell, smaller than the

four casting bells described above, was delivered to the complex in April 1979 and was installed in one of the four original cast/cure buildings in July 1979 (Figure 13). This casting bell was [redacted] meters; large enough to cast either stage of the Chinese SLBM.

12. (S/D) Fourteen new buildings were constructed in the western end of the plant during the period since 1975 (Figure 3). Construction in this area also included an underground probable personnel shelter.

### Rocket Motor Test Facility

13. (TSR) Evidence of at least sporadic test activity was seen at this facility, although no blast marks were observed at either of the two horizontal test cells. In April 1976, two probable SLBM rocket motors were on the west concrete apron at the probable temperature conditioning building (Figure 14). These motors were [redacted] long; each was [redacted] in diameter. These dimensions correspond closely with the assessed dimensions of the Chinese SLBM stages.<sup>8</sup> The motors remained at the temperature conditioning building until October.

14. (TSR) In March 1977, a single SLBM-sized rocket motor was on the same concrete apron. This motor was [redacted] long and [redacted] meters in diameter. This motor remained on the apron until February 1978, when the motor was moved to the area between the two concrete aprons.

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15. (TSR) Numerous small-diameter probable rocket motors were between the concrete aprons at the temperature conditioning building throughout the period since June 1975. In general, these probable motors were approximately [ ] meters long and [ ] in diameter. Their intended use is not known. These probable rocket motors could indicate, however, that the Hohhot complex is developing rocket motors of unknown function in addition to rocket motors for the SLBM. The number and positioning of these probable rocket motors varied slightly during the reporting period.

16. (TSR) A cylinder was observed near the end of the exhaust apron at test cell 1 in early 1980. This cylinder may have been a discarded rocket motor or a diffuser section (item 4, Figure 15) thrown clear of the test cell in a test accident. On the same imagery, the erosion of the concrete exhaust apron appeared to be more extensive than in 1975. It is not known when this erosion occurred, because the exhaust apron was rarely seen with sufficient resolution to see the erosion.

17. (TSR) The vacuum chamber dolly was seen on the exhaust apron at test cell 2 in September 1978; the dolly was aligned with the long axis of the test cell, as if to emplace something in the cell for testing. The dolly remained in this position at least until October 1978.

18. (TSR) The sliding circular door on the nozzle test position has been open slightly several times since 1975. In late 1977, a flatbed trailer was near the test position; the trailer might have been used to transport a rocket motor for testing.

19. (S/D) In late 1975, a self-propelled crane and a possible flatbed trailer were near the drop test position—the crane may have been lifting an unidentified object onto the drop test position for testing.

20. (TSR) The older vacuum chamber and its dolly remained on the ground next to test cell 2 until September 1978, when the dolly was seen on the exhaust apron at test cell 2. In March 1979, the vacuum chamber had been moved to the road between test cell 2 and the drop test position. The new vacuum chamber described in the previous report was not observed in the test area until June 1980.

21. (S/D) In August 1978, a foundation area was prepared for a new control building (item 1, Figure 15), next to the old control building. No construction has taken place yet.

#### **Inert Components Fabrication Plant**

22. (S/D) The five casting bells described previously were delivered to this area before being transferred to the rocket motor production plant—the smaller casting bell in March 1979 and the four larger ones in early June. In March 1979, the smaller bell was seen on the rail dock next to a short, boxlike, undesignated railcar which resembled railcars seen regularly at Beijing Guided Missile Plant Nanyuan [ ] indicating that the smaller casting bell (and perhaps also the four larger ones) were possibly made at Nanyuan and then shipped to the Hohhot complex. The  
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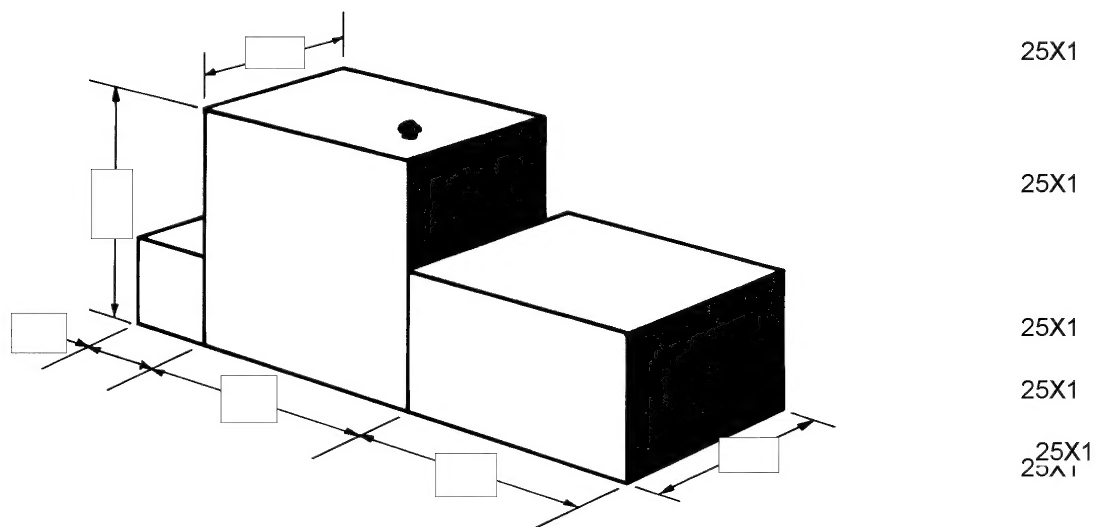
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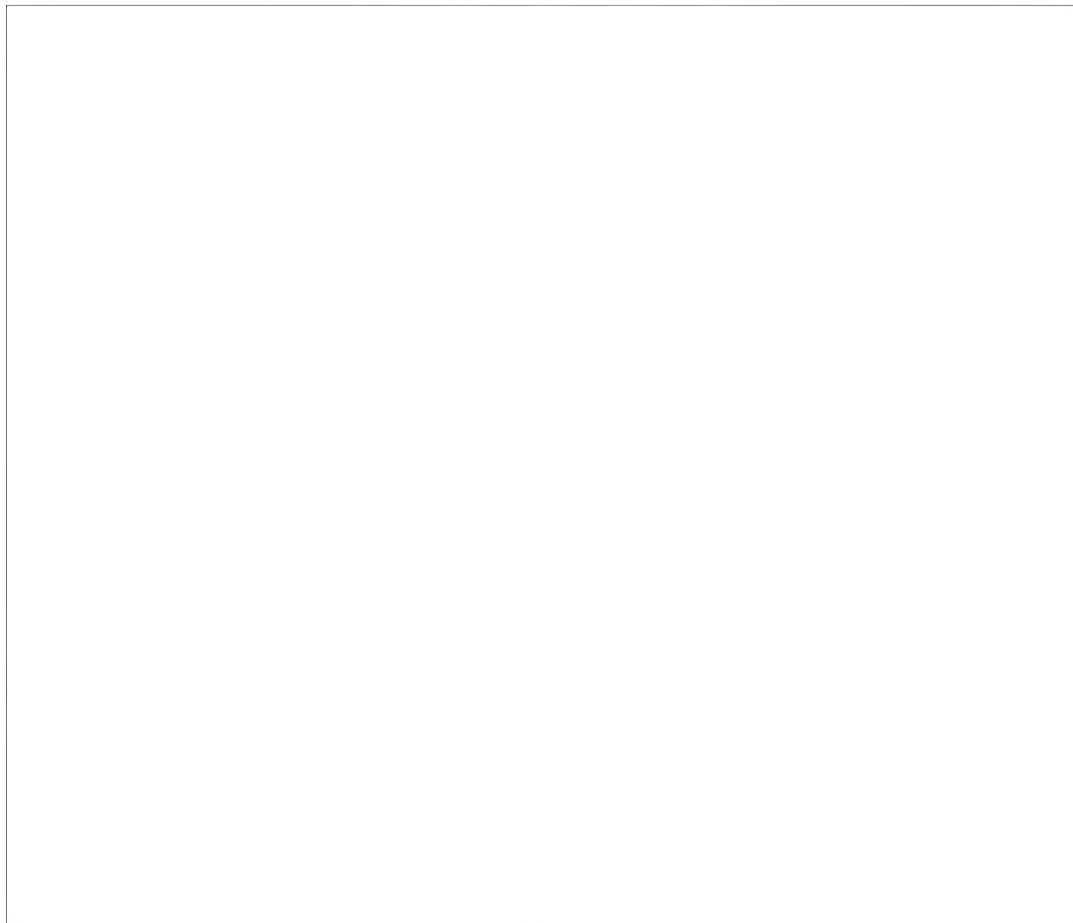
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FIGURE 10. NEW BATCH-MIX BUILDINGS



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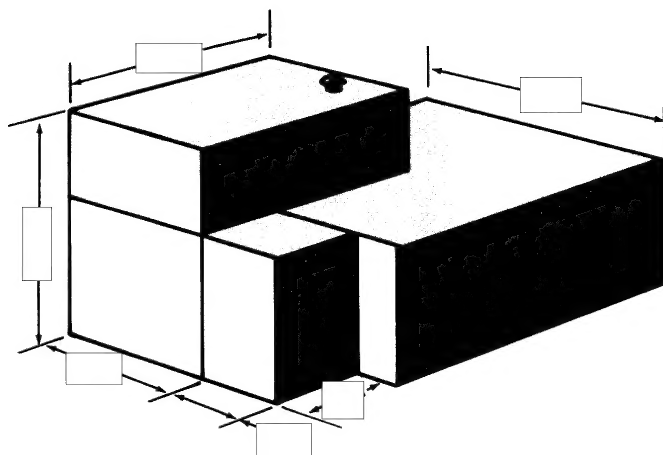
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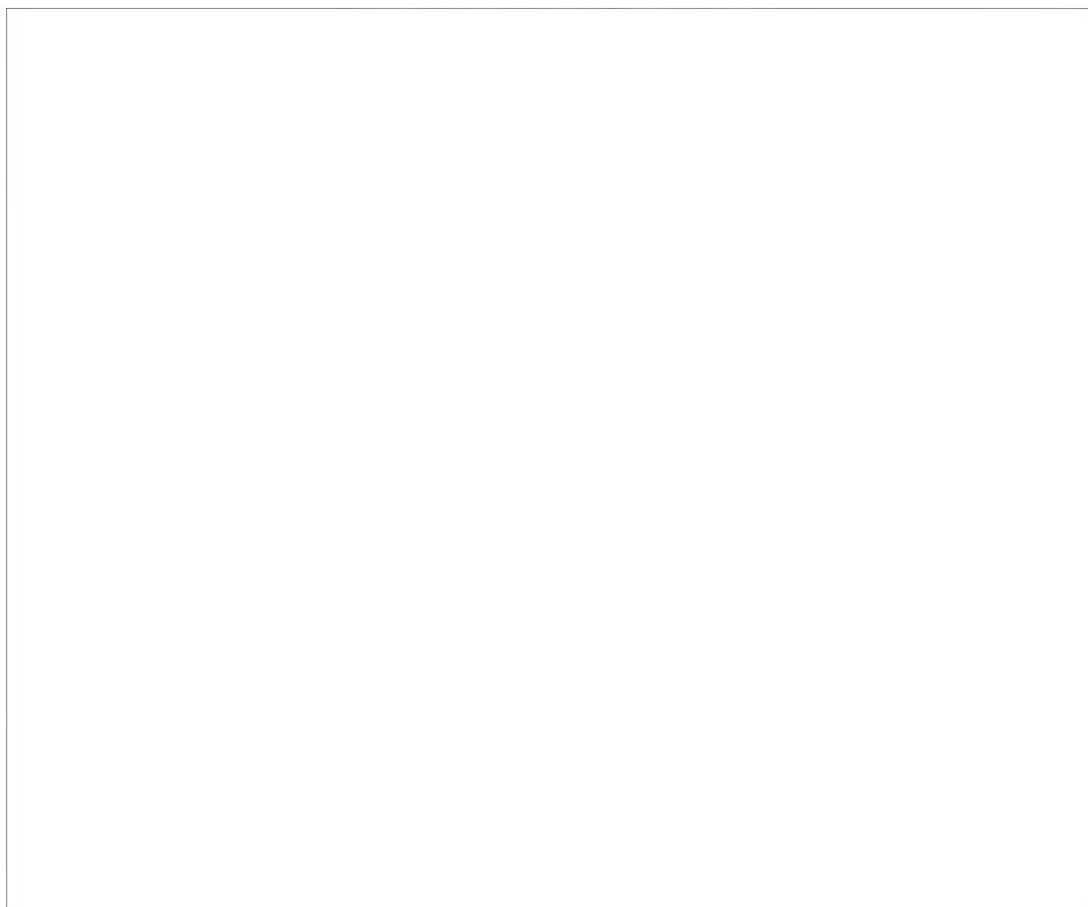
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**FIGURE 12. RECONSTRUCTED BATCH-MIX BUILDING**



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Nanyuan plant has serviced and has possibly even manufactured some of the SLBM programs equipment, even though Nanyuan is primarily a liquid-propellant missile plant. An SLBM launch tube liner was seen at Nanyuan from 1976 until December 1978 and again from October 1979 until early 1980. An SLBM-associated transporter was observed at Nanyuan in 1977.

23. (TSR) Three undesignated probable missile-related railcars were observed on the rail spur in May and September 1978 (Figure 16). Two were light-toned boxcar-like railcars, and one was a flatcar which may have had two rails like those of type B missile transfer flatcars. All three railcars were approximately [ ] long. Three railcars closely resembling these three (perhaps the same three) were at the Nanyuan plant in July 1979. These railcars may be used to ship missile stages, components, or related equipment.

24. (S/D) A long rail-in building was constructed at one end of the coal yard between November 1977 and September 1978 (Figure 16 and item 3, Figure 17 and Table 1). Although previously identified as a rail-to-road transloading building, it has no doors except for the rail-in entrance, and the building is only wide enough to accommodate railcars on a single track. At the same time, the quality of construction is too high for the building to be a concealment building—most known concealment buildings in China are of simple construction. The exact function of the long rail-in building is undetermined at this time.

25. (S/D) Activity at the explosives forming facility was seen in 1979. A self-propelled crane was between the two explosives forming pits in May 1979 and appeared to be lifting an unidentified object from a dolly or flatbed trailer. In June, the crane was at the large pit, which was full of water. Later in June, the area around the large pit was dark toned, probably because of water overflow.\* The cover of the small pit was seen alternately on and off several times during this period. Probable rocket motor end-dome molds were seen on the concrete apron at the explosives forming facility throughout the reporting period. Their number and positions changed from time to time. The diameter of these probable end-dome molds matches the diameter of the SLBM motors. Numerous rings of the same diameter have been seen throughout the area.

26. (S/D) Construction began in this area in mid-1978, the same timeframe as that of the new buildings in the rocket motor production plant. Construction has included three large fabrication buildings, ten support buildings, and the foundation for one still unidentified building (Figure 17).

#### Probable Final Assembly and Inspection Area

27. (S/D) No major changes have occurred in this area since June 1975. Construction materials outside the probable final assembly buildings early in the reporting period suggested that internal modification was underway.

28. (S/D) An SLBM-sized probable rocket motor was at the northernmost final assembly building

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\*Explosives forming pits are filled with water before explosives are detonated to form sheet metal into dome shapes.

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from February 1974 until April 1976, when it was apparently relocated near the westernmost inspection building. The motor remained there until March 1977. It was approximately [redacted] meters in diameter.

29. (S/D) Trucks were seen near the probable final assembly buildings on several occasions in 1979 and sporadically during the rest of the reporting period. This may indicate an increase in activity in 1979.

#### Support Area

30. (S/D) Previous reports identified this area as a northern housing area and a southern housing area. Construction during and before this reporting period has filled the gap between the two areas, so that it is now a single support area (Figure 18).

31. (S/D) Extensive construction since mid-1979 has at least doubled the amount of housing floorspace available to the complex and has added new support facilities. Construction included a multi-wing administration building, nine multistory apartment buildings (probably with more not yet begun), approximately 30 barracks-type structures, a probable underground personnel shelter, and approximately 19 support buildings (Figure 18).

#### Imagery Analyst's Comments

32. (S/D) The new cast/cure, mix, and fabrication facilities begun in mid-1978 will greatly ex-

pand the production capacity of the Hohhot complex. Four casting/curing pits within one building strongly indicate that series production is planned. The size of both the casting pits and the casting bells indicates that rocket motors of up to approximately [redacted] in diameter could be produced. The dimensions are comparable to the US Minuteman first stage, approximately [redacted] meters.<sup>4</sup> If a rocket motor of this size were mated with the two-stage SLBM which China has been developing for some years, the result would be a three-stage ICBM similar in size to the Minuteman III.<sup>4,8</sup>

33. (S/D) It cannot be determined at this time how soon China plans to develop rocket motors of this size. Common practice in the US is to construct new facilities with a capacity allowing for future systems. [redacted]

34. (TSR) In spite of this, several items point to the possibility that a program is already underway to develop rocket motors larger than those of the SLBM. A transporter at Lantian Solid Propellant Production Complex [redacted] (Figure 19) from September 1978 to February 1980 is of sufficient size to carry the largest motor capable of being produced at Hohhot.<sup>9</sup> Such a transporter could eventually be used at any of China's three known composite propellant plants—Hohhot, Lantian, or Yuanan Solid Propellant Production Com-

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**Table 1.**  
**Inert Components Fabrication Area**  
**(Items keyed to Figure 17)**

*This table in its entirety is classified SECRET/WNINTEL*

Item	Probable Function	Dimensions (m)	
		L	W
1	Stor/support bldg		
2	Support bldg		
3	Long rail-in bldg		
4	Stor/support bldg		
5	Stor/support bldg		
6	Fab bldg		
7	Fab bldg		
8	Stor/support bldg		
a	Sect		
b	Sect		
c	Sect		
9	Fab bldg		
10	Stor/support bldg		
11	Stor/support bldg		
12	Stor/support bldg		
13	Stor/support bldg		
14	Stor/support bldg		
15	Bldg foundation (unid)		

\*Overall dimensions of irregular bldg.

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plex [ ] Another item is the simultaneous construction of the new facilities and refurbishment of the older facilities, which were already capable of supporting the SLBM program. The new facilities may be used to develop large rocket motors, while the older facilities support the SLBM program. This is further supported by the large capacity of the new batch-mix buildings—comparable to the largest mixers at US missile plants. Conversely, the new facilities could still be used for series production of the SLBM during the heaviest production schedule of that system. Finally, the expansion of housing floor-space indicates a new program.

35. (S/D) A more immediate purpose for both new and rebuilt facilities at Hohhot may be to support series production of the SLBM. Almost all of the activity in the test facility and inert components fabrication plant since 1975 was SLBM-

related, especially the rocket motors, end-dome forming dies, and handling rings. No such indications of larger rocket motors have been seen yet. The activity at Hohhot since 1975 does not indicate extensive production or testing, but the activity does indicate at least that development is continuing.

36. (S/D) Construction of the new facilities at Hohhot—which are geared for series production—was begun at about the same time as initial indications of ballistic missile submarine construction were seen at Huludao Naval Shipyard Base [ ]<sup>11</sup> The correlation of time between the two may indicate that the SLBM development phase is nearly complete and that series production of SLBMs is planned in the near future. The recent indications of SLBM test activity at Wuzhai Missile Test Center [ ] also indicates that the SLBM program may be entering the late stage of development.

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**REFERENCES****IMAGERY**

(S/D) All applicable satellite imagery acquired from [ ] was used in the preparation of this report.

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**MAPS OR CHARTS**

SAC. US Air Target Chart, Series 200, Sheet 0288-24, scale 1:200,000 (SECRET)

**DOCUMENTS**

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2. NPIC. [ ] SR-072/78, *Expansion of Rocket Motor Development/Production Capability at Hu-ho-hao-te Complex, PRC (TSR)*, Oct 78 (TOP SECRET [ ]) 25X1
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**REQUIREMENT**

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(S) Comments and queries regarding this report are welcome. They may be directed to [ ] Asian Forces Division, Imagery Exploitation Group, NPIC, [ ]

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